

ONTARIO MINISTRY OF ENVIRONMENT



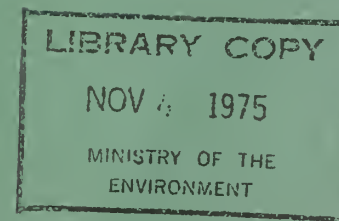
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OPERATING SUMMARY

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TOWN OF
KIRKLAND LAKE
WATER POLLUTION CONTROL PLANT

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1974**

Kirkland Lake : water pollution
control plant.
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Ontario

MINISTRY OF THE ENVIRONMENT

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KIRKLAND LAKE
WATER POLLUTION CONTROL PLANT

MINISTRY OF THE ENVIRONMENT

1974 ANNUAL OPERATING SUMMARY

prepared by

Plant Performance Unit

TECHNICAL SERVICES BRANCH

T. Cross, Director



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'74 Review

GENERAL

This project consists of a secondary treatment plant utilizing the contact stabilization process and a storm flow holding tank. The plant has a design flow capacity of 3.0 million gallons per day and a peak flow capacity of 4.5 million gallons per day. The storage capacity in the holding tank is 250,000 gallons. The plant is totally enclosed in an insulated metal building. The treated effluent is discharged to Murdock Creek.

The project is operated by a Chief Operator, two full-time operators and three casual operators, twenty-four hours per day until such time as the controls for the by-pass gate are installed. It is expected that the controls will be installed in June, 1975. After the installation, the staff complement will be reduced by two casual operators and the operating time reduced to 8.0 hours per day.

The major outstanding deficiencies at year end which will be corrected by the consulting engineer working in conjunction with the Ministry's Project Coordination Branch in 1975 are as follows:

1. D.C. controls for the by-pass sluice gate will be installed in June, 1975.
2. Fluctuating levels in the contact tank which has resulted in surging of the clarifier and in poor operation of the clarifier.
3. Moisture accumulation in the building which is resulting in corrosion of the metal framework in the building.
4. The skimmer unit is not removing the scum build-up in the clarifier properly. The skimmer unit will have to be modified or replaced.
5. The raw sewage pumps fail occasionally on current overload. Modifications to the pumps and/or controls are necessary.
6. Settling of solids in the stabilization and contact tanks which has resulted in anaerobic conditions in the bottom of the tanks and it is suspected odour problems in the building.

The serviced population in 1974 was approximately 12,700 and the per capita flow was 124 gallons per day.

EXPENDITURES

The total operating cost for the year was \$102,205 and the average cost per million gallons of sewage treated was \$196.

PLANT FLOWS AND CHLORINATION

The plant was out of operation for the month of January for repairs and modifications. The plant also accepted only about 50% of the flow from the system from February to June due to operating problems. The average daily flow from February to the end of the year was 1.58 million gallons.

The effluent was chlorinated from March 1 to November 21. A total of 19,500 pounds of chlorine was used during that time, representing an average chlorine dosage of 5.3 mg/l.

PLANT EFFICIENCY

The raw sewage BOD and suspended solids concentration averages were 39 mg/l and 120 mg/l respectively.

The final effluent BOD and suspended solids concentration averages were 9 mg/l and 18 mg/l respectively and represent removal efficiencies of 77 percent for BOD and 85 percent for suspended solids.

AERATION

The average MLSS in the stabilization tank was 3500 mg/l and the F/M ratio was 0.04 lbs. BOD/day per lb. of MLSS.

SLUDGE DIGESTION AND DISPOSAL

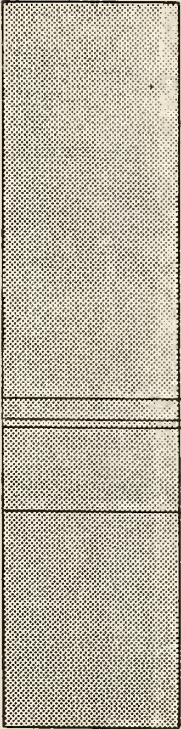
The sludge wasted to the aerobic digester had an average suspended solids concentration of 0.43 percent of which the volatile solids content averaged 66 percent. A total of 3,042 cubic yards of digested sludge was removed at an average suspended solids concentration of 1.66 percent.

CONCLUSIONS

The plant produced an acceptable effluent for the flow which was treated although this was not representative of all the flow from the collector system. A considerable amount had to be by-passed because of operating problems which resulted from construction and design deficiencies some of which were corrected in the first six months of the year. There are still six major deficiencies which have to be corrected. The consulting engineer and the Ministry's Project Coordination Branch are presently taking the required corrective action to remedy these deficiencies.

ANNUAL COSTS

1974 OPERATING COSTS



● SALARIES & WAGES	54 %
● EMPLOYEE BENEFITS	3 %
● TRANSPORTATION & COMMUNICATIONS	1 %
● SERVICES	12 %
● SUPPLIES & EQUIPMENT	30 %
● AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	
● TRANSFER PAYMENTS	
● OTHER TRANSACTIONS	

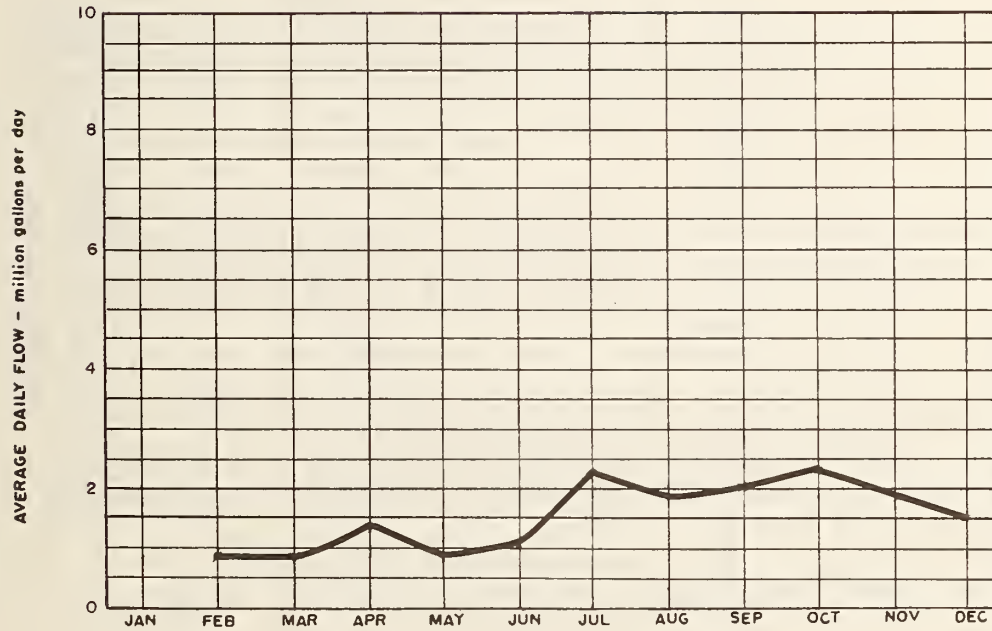
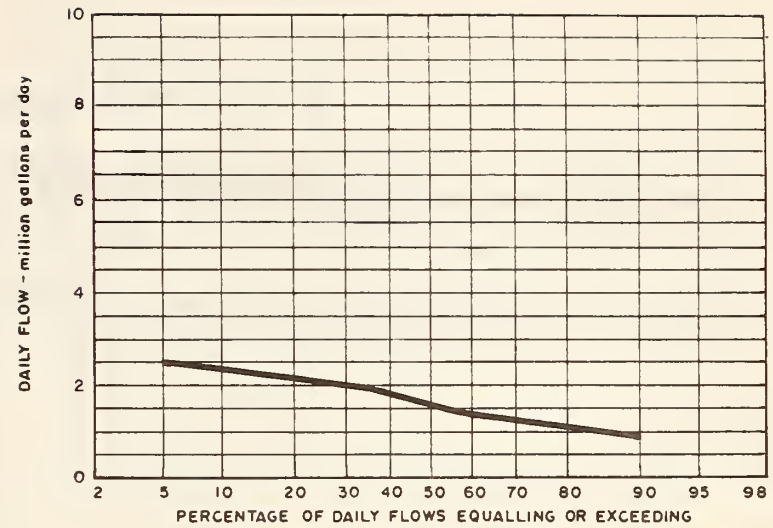
YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			\$/M.G	¢/lb BOD
1974	522.8	102205	195	65

OPERATING EXPENDITURES

Regular Staff	\$ 33,881	\$
Casual (Unclassified) Staff	21,319	
TOTAL SALARIES AND WAGES		55,200
TOTAL EMPLOYEE BENEFITS		3,147
TOTAL TRANSPORTATION AND COMMUNICATIONS		1,369
Insurance	1,183	
Sludge Haulage	10,010	
Repairs and Maintenance	480	
Other Services	114	
TOTAL SERVICES		11,787
Machinery and Equipment	3,692	
Chemicals	1,763	
Utilities	19,929	
Other Supplies and Equipment	5,318	
TOTAL SUPPLIES AND EQUIPMENT		30,702
TOTAL AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS		
TOTAL TRANSFER PAYMENTS		
OTHER TRANSACTIONS		
GRAND TOTAL	GRAND TOTAL	\$ 102,205

PROCESS DATA FLOWS

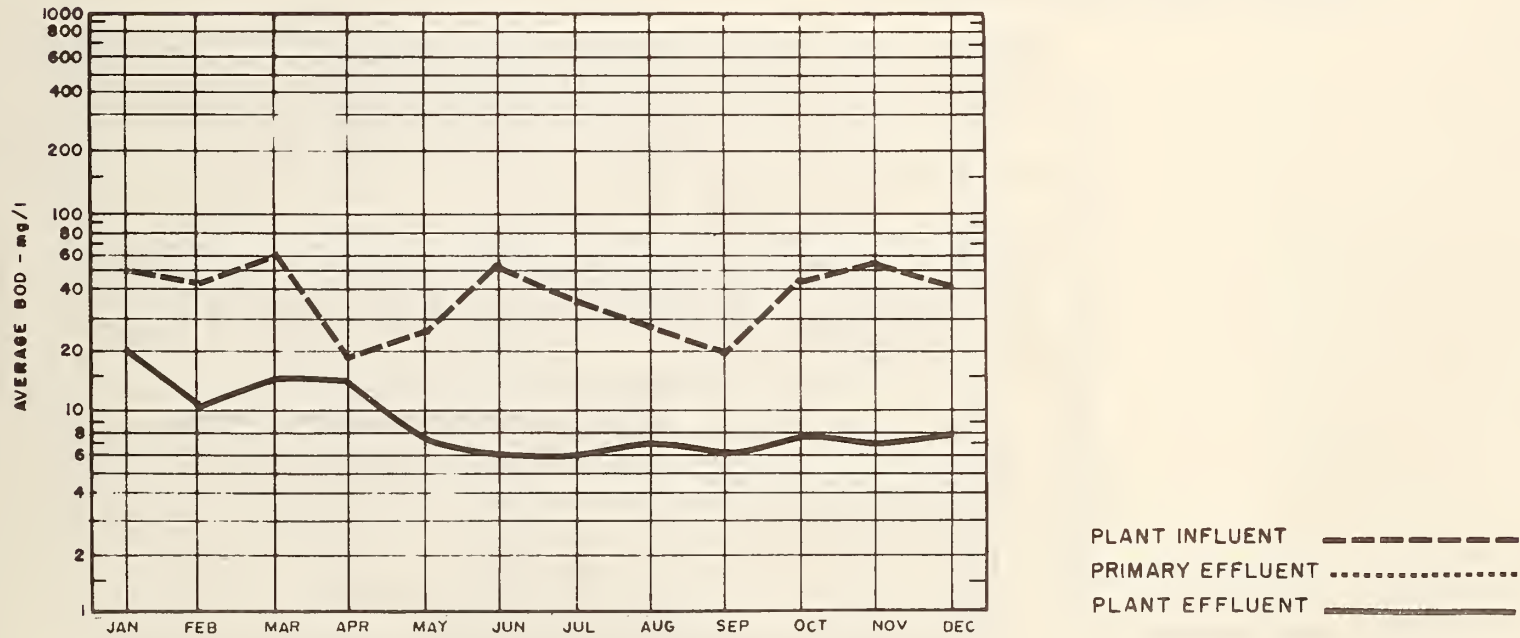
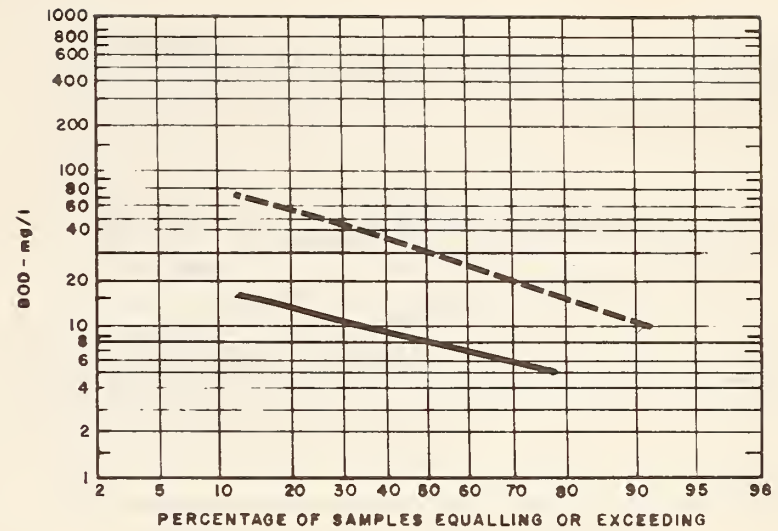


DESIGN CAPACITY — — — — —

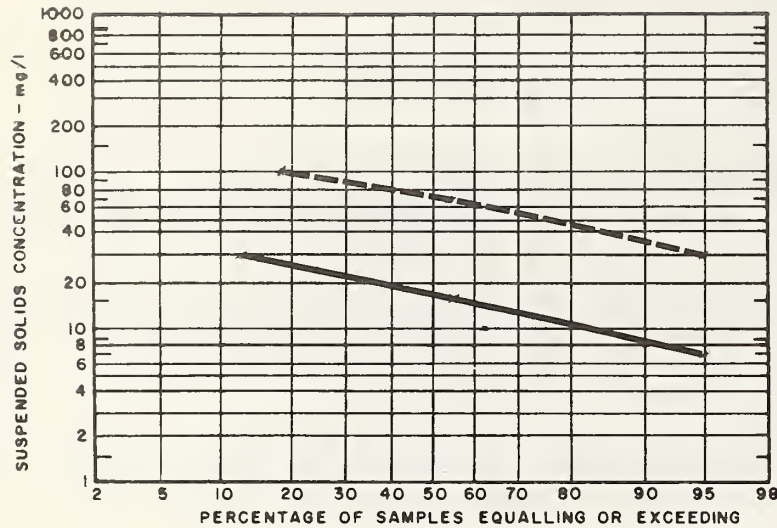
PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10 ³ pounds	mg/l	mg/l	%	10 ³ pounds	mg/l P	mg/l P
JAN				50	20	60		50	25	50		1.9	1.9
FEB	22.2	.89	.98	46	11	76	7.8	50	30	40	4.4	1.8	1.6
MAR	29.4	.95	1.20	60	15	75	13.2	80	40	50	11.7	3.9	1.8
APR	42.9	1.43	2.48	19	14	26	2.1	163	41	75	52.3	1.2	.8
MAY	27.7	.89	1.22	26	7	73	5.3	52	15	71	10.2	2.2	1.4
JUNE	34.2	1.14	2.19	55	6	89	16.8	73	11	85	21.2	2.4	1.6
JULY	74.1	2.39	3.84	37	6	84	23.0	83	15	82	50.4	2.3	1.8
AUG	60.8	1.96	2.35	29	7	76	13.4	73	13	82	36.5	2.8	2.3
SEPT	60.5	2.02	2.50	20	6	70	8.5	76	12	84	38.7	2.8	2.1
OCT	68.8	2.20	2.60	46	8	83	26.1	397	15	96	260.8	21.0	1.4
NOV	55.7	1.90	2.30	55	7	87	26.7	78	14	82	35.6	2.4	1.5
DEC	46.5	1.50	2.30	42	8	81	15.9	75	12	84	29.2	2.5	1.6
TOTAL	522.8	-	-	-	-	-	156.8	-	-	-	533.3	-	-
AVG.		1.58	MAXIMUM 3.84	39	9	77	14.3	120	18	85	48.5	4.0	1.7
No. of Samples	-	-	-	22	23	-	-	58	57	-	-	23	21

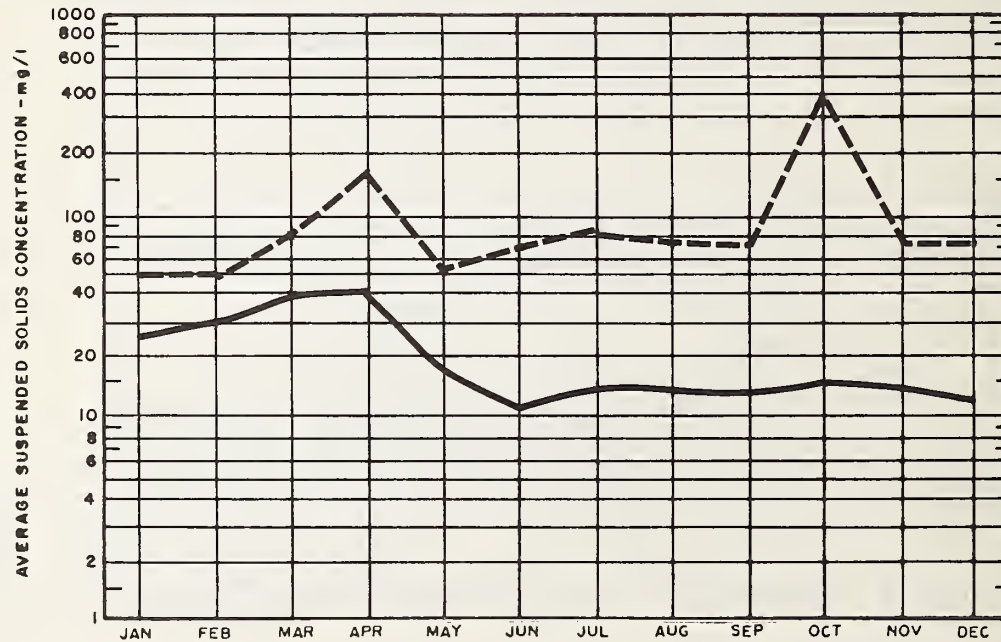
BIOCHEMICAL OXYGEN DEMAND



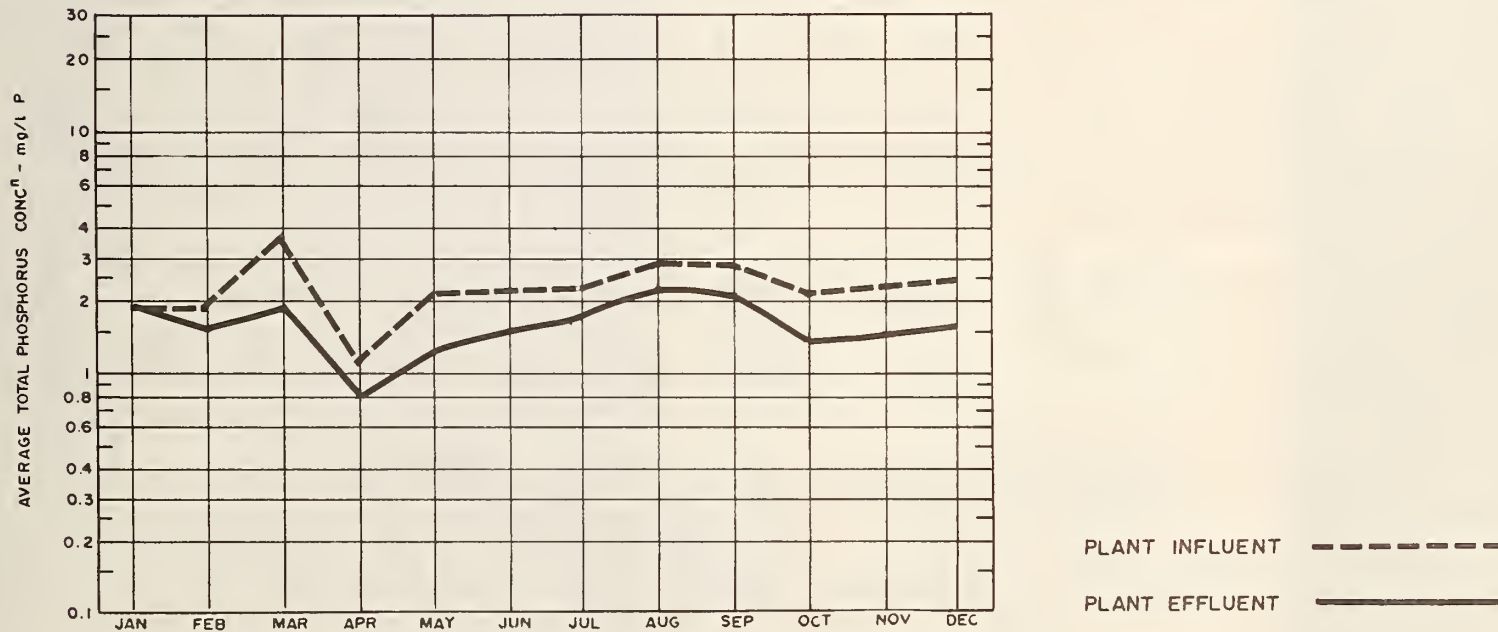
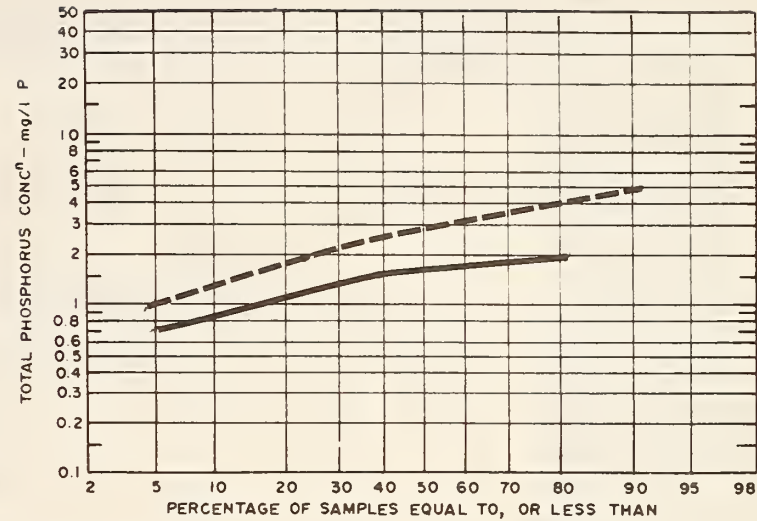
SUSPENDED SOLIDS



PLANT INFLUENT - - - - -
 PRIMARY EFFLUENT
 PLANT EFFLUENT ———



PHOSPHORUS

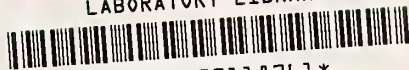


TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED cubic feet	Cl ₂ USED 10 ³ pounds	AVG. DOSAGE mg/l	MLSS. CONC mg/l	F/M day ⁻¹	AIR USED 1000 ft lb BOD	QUANTITY 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	QUANTITY REMOVED 10 ³ gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	AMOUNT HAULED cubic yards
JAN				180				800					
FEB	216			1200	.08			1500	79		1200	68	
MAR	108			1900	.06			2400			1700	70	
APR	270			4000	.02			5000	65		4200	62	
MAY	162	1.9*	6.9	3700	.01			3900	57		6800	57	
JUNE	270	2.1	6.1	2900	.05			2900	63		9300	61	
JULY	432	3.0	4.1	5500	.04			7600	54	210	15000	53	1248
AUG	297	3.5	5.7	5800	.02			5900	70	15	5400	85	87
SEPT	459	3.5	5.8	4600	.02			5700	62	13	15000	58	75
OCT	432	3.5	5.2	4600	.04			6100	62	124	16000	58	739
NOV	378	2.0	5.0	4300	.05			5500	74	96	19000	63	570
DEC	162			3300	.04			4500	72	54	23000	64	323
TOTAL	3186	19.5	-	-	-	-		-	-	512	-	-	3042
AVG.	6.1 cu. ft/mil gal	3.3	5.3	3500	.04			4300	66		11000	64	

* Chlorination period: March 1 - November 21

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